

electrocube RoHS Compliant & Pb-Free

Blanket Certification for Standard Film Capacitor & RC Network Products

- Solid Round Wire-Lead Terminations for Soldered Installation / Connection

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RoHS & Pb-FREE REQUIREMENTS -

The requirements for RoHS Compliance are defined by:
EU Directive 2002/95/EC of 27 January 2003 (RoHS)
EU D-G Environment Guidance Document FAQ on RoHS & WEEE dated May 2005
EU Commission Decision 2005/618/EC of 18 August Amending Directive 2002/95/EC
EU Commission Decision 2005/717/EC of 13 October 2005 Amending Annex of 2002/95/EC
EU Commission Decision 2005/747/EC of 21 October 2005 Amending Annex of 2002/95/EC
The requirements for Pb-Free compliance are defined by:
JEDEC Standard JESD97 / IPC Standard IPC-1066

RoHS COMPLIANT / Pb-FREE PRODUCT DESCRIPTION -

Electrocube "standard" series of film capacitors are axial and radial wire-lead terminated components having cylindrical or ovalized tape-wrapped and epoxy end-filled, or epoxy-filled plastic box package styles. Hermetic capacitor product, Series 524 have cylindrical metal cased component bodies and axial lead-wires. Electrocube "standard" series RC Network RG1780 – RG1784 are radial wire-lead terminated components having epoxy-filled plastic box package styles. Electrocube "standard" series RC Network RG2675 – RG2678 are radial wire-lead terminated components having epoxy-dipped package styles. These products are typically applicable to plated-through-hole installation on circuit boards, and are solder terminated manually, or by wave-solder machine process, or are manually solder terminated into wired assemblies.

Electrocube standard film Capacitor and RC Network products (as listed), supplied to our Distributors and OEM Customers as of date code 0540 (YYWW) and subsequent, shall be considered RoHS Compliant and Pb-Free, unless specifically acceptable and contracted otherwise. RoHS Compliant and Pb-Free product is specifically identified as such (refer to following commentary). The Electrocube part numbers, for the RoHS Compliant and Pb-Free products, are identical to that of the pre-existing non-compliant product configurations.

Standard / Catalog Series Products (all package styles):

- 230/231/232 Series Metallized Polyester Film Capacitors
- 250/251/252 Series Polyester Film & Foil Capacitors
- 330 Series Metallized Polyphenylene Sulfide Film Capacitors
- 650/652/653 Series Metallized Polycarbonate Film Capacitors
- 931/932/935 Series Metallized Polypropylene Film Capacitors
- 945 Series Metallized Polypropylene Film Capacitors
- 950/951/952 Series Polypropylene Film & Foil Capacitors
- 730 Series Combination Film Capacitors
- RG1780/RG1781/RG1782/RG1783/RG1784 Series RC Networks
- RG2675/RG2676/RG2677/RG2678 RC Networks

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CURRENT EXCEPTIONS

The following standard product series are currently RoHS Compliant, but shall not be considered Pb-Free.

524 Series Hermetic Polyester / Kraft Film & Foil Capacitors

The following standard product series ARE NOT currently RoHS Compliant and Pb-Free, but may be provided as such, as required by specific customer requirement, and as negotiated at time of quotation and order placement.

520 Series Polyester / Kraft Film & Foil Capacitors

RoHS COMPLIANT CONTENT CERTIFICATION -

Electrocube confirms that the listed standard product series (less exceptions noted), of date code 0540 (YYWW) and subsequent, ARE COMPLIANT within the restrictions of the (current revision of) EU RoHS Directive 2002/95/EC and EU Commission Decisions / Amendments and EU D-G Environment Guidance documents, regarding content of PBB and PBDE flame retardants, and heavy metals Pb, Hg, Cd, and Cr⁺⁶. The materials and components, utilized in product construction, are understood to not intentionally contain the restricted flame retardant materials and heavy metals, and any un-intentional impurity-level content will be within restriction limitations of the (current revision of) EU RoHS Directive 2002/95/EC, and EU Commission Decisions / Amendments and EU D-G Environment Guidance documents.

<u>SUBSTANCE</u>	<u>LIMIT</u> (by weight in homogenous material)
Lead (Pb)	<=0.1%
Exemption, Annex Point 5 & 7	no limit in glass and ceramic elements of electronics components
Exemption, Annex Point 6	<=0.35% as alloying element in steel
Mercury (Hg)	<=0.1%
Cadmium (Cd)	<=0.01%
Hexavalent Chromium (Cr ⁺⁶)	<=0.1%
Polybrominated biphenyls (PBB)	<=0.1%
Polybrominated diphenyl ether (PBDE)	<=0.1%
Exemption, Annex Point 9a	no limit for DecaBDE in polymeric applications

Exemption per RoHS Directive 2002/95/EC Annex Point 9a, is exercised for content of specific PBDE flame retardant DecaBDE. The materials utilized in product construction are understood to intentionally contain specific flame retardant DecaBDE in-excess of the limitations imposed as a PBDE, but specifically exempted and acceptable by Commission Decision 2005/717/EC and Amendment to the Annex of the RoHS Directive. This exemption is primarily applicable to a wide range of Electrocube Capacitor Series having tape-wrapped cases. The affected product series can be certified to be RoHS Compliant. Exercise of the DecaBDE exemption by Electrocube will be for a limited time, as the applicable materials are replaced with materials fully compliant without exercise of exemption 9a.

Exemption per RoHS Directive 2002/95/EC Annex Point 6, is exercised for content of Lead (Pb) as an alloying element in steel containing up to 0.35% Pb by weight. This exemption is applicable to hermetically sealed Electrocube Capacitor Series 524. This product series can be certified to be RoHS Compliant, but cannot be considered / certified to be Pb-Free. This exemption is potentially applicable to RC Network Series RG2408, RG2409 and RG2411. These product series are not currently, but will by 07/01/06 be certified as RoHS Compliant, but may or may not be considered / certified to be Pb-Free.

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Exemption per RoHS Directive 2002/95/EC Annex Points 5 and 7, is exercised for content of Lead (Pb) as an element in glass and ceramic elements of electronics components. This exemption is applicable to hermetically sealed Electrocube Capacitor Series 524. This product series can be certified to be RoHS Compliant, but cannot be considered / certified to be Pb-Free.

NOTE: Full and unequivocal certification that the listed Electrocube standard product series will meet the flame retardant and heavy metal restrictions of EU RoHS Directive 2002/95/EC and EU Commission Decisions / Amendments, EU D-G Environment Guidance and any outstanding RoHS TAC Draft documents, is pending finalization of RoHS requirements.

Pb-FREE CONTENT CERTIFICATION -

Electrocube confirms that the listed standard product series (less exceptions noted) of date code 0540 (YYWW) and subsequent, ARE COMPLIANT within the industry accepted definition of Pb-Free, regarding content of heavy metal Lead (Pb). The materials and components, utilized in product construction, are understood to not intentionally contain the restricted heavy metal, and any un-intentional impurity-level content will be within restriction limitations of the definition of Pb-Free, per the (current revision of) Industry Standards JEDEC JESD97, and IPC-1066, and of the (current revision of) EU RoHS Directive 2002/95/EC, and EU Commission Decisions / Amendments and EU D-G Environment Guidance documents, excluding specific exemptions of the RoHS Directive for Pb content in excess of 0.1%.

<u>SUBSTANCE</u>	<u>LIMIT*</u>
Lead (Pb)	<=0.1%

*by weight in homogenous material / discrete raw materials, and total weight in end-product, RoHS Annex Exemption Points 5, 6, and 7 allowing >0.1% Pb content are excluded / not-applicable.

RoHS COMPLIANT / Pb-FREE PRODUCT QUALIFICATION -

Electrocube certifies that the functional electrical performance and reliability characteristics of the RoHS Compliant and Pb-Free configurations of the applicable standard product series are equivalent to that of products previously / historically provided.

RoHS COMPLIANT / Pb-FREE PRODUCT IDENTIFICATION -

The listed Electrocube products are not directly marked to indicate RoHS Compliant or Pb-Free status. The lowest level of product packaging is marked with date code information by which compliance status may be primarily determined. Date code information may or may not be directly marked on product, based upon physical size and configuration of product, available marking capability and cost. The lowest level of product packaging, as well as shipping documentation (shipper / invoice & C of C) additionally includes specific marking or labeling to indicate product compliance status by way of appropriate RoHS Compliant and Pb-Free symbology and text, reference JEDEC JESD97.

Pb-FREE TERMINATION FINISH CATEGORY -

Electrocube provides RoHS Compliant and Pb-Free product having Tin (Sn) plated leads wires, which are Category "e3" per JEDEC Standard JESD97.

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PRODUCT MOISTURE SENSITIVITY CLASSIFICATION

Industry standards / requirements such as IPC/JEDEC Standards J-STD-020 & J-STD-033, and EIA/JEDEC Publication JEP113, for special classification, identification and packaging in regards to moisture sensitivity, are specifically applicable to surface mounted components exposed to higher temperature oven-reflow soldering processes, and not applicable to typical Electrocube standard products, to be manually or machine (wave-flow) solder terminated.

Pb-FREE SOLDER PROCESS TEMPERATURE - DURATION CAPABILITY -

Electrocube's standard products, in pre-existing lead-containing, and in current lead-free configurations might be considered to be temperature sensitive in machine or manual soldering processes based upon pre-existing limitations of basic plastic materials from which they are constructed, and not on the basis of a change to lead-free content.

In machine controlled (wave-flow) soldering processes the combination of top and bottom side preheating, and exposure over soldering stage shall not result in component body temperatures exceeding the limitations of the applicable dielectric materials (105 deg. C for polypropylene, and 125 deg. C for polyester and polycarbonate). The maximum peak (solder) temperature and duration might be characterized as 245 deg. C for 5 seconds, or 250 deg. C for 3 seconds.

Manual soldering processes should utilize temperature controlled soldering iron systems having temperature of 600 to 700 deg. F (316 to 371 deg. C) and a heating duration of 2 to 5 seconds.

Pb-FREE SOLDER PROCESS COMPATIBILITY-

In regard to elevated temperature capability and solderability, the pre-existing lead-containing and tin-lead plated, and current lead-free and tin plated configurations of the listed Electrocube standard products should be considered backward COMPATIBLE with manual and machine (wave) soldering processes (controlled within the noted guidelines) utilizing conventional tin-lead solder alloys Sn63Pb37 or Sn60/Pb40.

In regard to elevated temperature capability, the pre-existing lead-containing and tin-lead plated, and current lead-free and tin plated configurations of the listed Electrocube standard products should be considered NOT COMPATIBLE with Pb-Free machine (oven-reflow) solder profile per IPC/JEDEC Standard J-STD-020, and NOT COMPATIBLE with a typical lead-free wave-flow solder process based upon temperature limitations of dielectric material. The necessarily increased temperatures and durations of all stages of the Pb-Free oven-reflow or wave-flow solder process will significantly exceed the temperature capability the plastic dielectric materials from which these products are constructed resulting in defective components.

In regard to elevated temperature capability and solderability, the pre-existing lead-containing and tin-lead plated, and current lead-free and tin plated configurations of the listed Electrocube standard products should be considered forward COMPATIBLE with lead-free manual soldering processes (controlled within the noted guidelines).